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against the dark back-ground afforded by the Sierras Sangre de Christo and Belanca. Outside of this range of sandhills along their whole extent stretches a perfect *arena* (literally), into the eastern end of which a river of considerable size rushes down, and is utterly lost in five hundred yards, reappearing again, much diminished, several miles below. This floor of sand and the square sides of the dunes to the very top has been ruffled by the wind into small irregular furrows identically the same as the ripple-marks made by the water on a sandy beach. But while the body of this pure fine sand is hammered as compact as that under the waves, the surface is a little softer, so as to readily receive and preserve in ordinarily still weather such delicate marks as the tracks of spiders and small lizards. I noticed also that portions of this ripple-marked floor which had not been recently disturbed, was of a slightly different color from newly exposed sand. It struck me at the time, that sand might easily be blown over this smooth surface without disturbing it, and should it lie there long enough to become rock, this first surface would form a natural line of separation between the strata, having every appearance of an old ripple-marked beach perhaps containing impressions and delicate fossils, when in fact no water had been near it, and the wind alone was accountable for the whole.—ERNEST INGERSOLL.

## MICROSCOPY.

### DOUBLE STAINING OF WOOD AND OTHER VEGETABLE SECTIONS.

—I have lately discovered that benzole fixes the anilines when they are used in staining vegetable and animal tissues. It not only instantly fixes any aniline color in vegetable tissues, but also renders them as transparent as oil of cloves.

Finding that benzole possessed this property, led me to try double staining upon sections of leaves and sections of wood. The results have proved highly satisfactory. I have found the following processes successful:—A section, say of wood, being prepared for dyeing, is put for five or ten minutes in an alcoholic solution of “Roseine Pure” (Magenta), one-eighth or one-quarter of a grain to the ounce. From this it is removed to a solution of “Nicholson’s Soluble Blue Pure,” one half-grain to the ounce of alcohol, acidulated with one drop of nitric acid. In this it should

be kept for thirty or ninety *seconds*, rarely longer. It should be frequently removed with the forceps during this period, and held to the light for examination, so that the moment for final removal and putting into benzole be not missed. After a little practice the eye will accurately determine the time for removal.

Before placing the object in benzole it is well to hold it in the forceps for a few seconds, letting the end touch some clean surface, that the dye may drip off, and the object may become partially dry. By doing this, fewer particles of insoluble dye rise to the surface of the benzole, in which the brushing is done to remove foreign matter. The object should then be put into clean benzole. In this it may be examined under the glass. If it is found that it has been kept in the blue too short a time, it should be thoroughly dried, and, after dipping in alcohol, be returned to that dye. If a section of leaf or other soft tissue be under treatment, it should be put in turpentine or oil of *juniper*, as they do not contract so much as benzole.

When hæmatoxylin is used instead of magenta, it is followed by the blue as just described. As neither of these dyes comes out in alcohol or in oil of cloves, the section may be kept in the former for a short time before placing in the latter.

The hæmatoxylin dye I prefer is prepared by triturating in a mortar for about ten minutes two drachms of ground Campeachy wood with one ounce of absolute alcohol, setting it aside for twelve hours, well covered, triturating again and filtering. Ten drops of this are added to forty drops of a solution of alum; twenty grains to the ounce of water. After one hour the mixture is filtered.

Into this the section, previously soaked in alum-water, is placed for two or three hours, or until dyed of a moderately dark shade. When dyed of the depth of shade desired, which is determined by dipping it in alum-water, the section is successively washed for a few minutes each, in alum-water, pure water and fifty per cent. alcohol. Finally it is put in pure alcohol until transferred to the blue.

Carmines and aniline blue produce marked stainings, but they are rather glaring to the eye under the glass. I use an ammoniacal solution of the former, double the strength of Beale's, substituting water for glycerine. In this a section is kept for several hours. On removal it should be dipped in water, and then put for a few

minutes in alcohol acidulated with two per cent. of nitric acid; then in pure alcohol; then in the half-grain blue solution before spoken of, from which it should be removed to alcohol; then to oil of cloves. Much color will be lost in the acid alcohol. The acid is to neutralize the ammonia, which is inimical to aniline blue. Magenta aniline or hæmatoxylon may be used with green instead of blue aniline. The brand of green I prefer is the iodine brand, one grain to the ounce of alcohol.

Double stainings of sections of leaves in which red is first used, have the spiral vessels stained this color, other parts being purple or blue. Radial and tangential sections of wood have the longitudinal woody fibres red, and other parts purple or blue.

This selection of color is, I think, due to the fact that spiral vessels and woody fibres take up more red than other parts, and are slower in parting with it. The blue, therefore, seems first to overcome the red in parts where there is less of it. It will entirely overcome the red if sufficient time be given.

If the blue be used before the magenta aniline, the selection of color is reversed.

I would here call special attention to the importance of examining these stainings at night, as the red in them has a trace of blue in it which does not show at that time, but comes out so decidedly by daylight, as to change, even spoil, the appearance of the specimen.

I think they should be mounted in Canada balsam, softened with benzole, as the presence of the latter may be beneficial in preserving its magnets.

I would offer a few words upon section-cutting, and upon preparing sections for dyeing.

To cut a thick leaf, place a bit of it between two pieces of potato or turnip, and tie with a string. Cuts may be made along the midrib, or across it, including a portion of leaf on either side, or through several veins. Fine shavings of wood may be used, or pieces rubbed down on hones.

Sections of leaves may be decolorized for staining by placing for some time in alcohol; but I would recommend the use of Labarraque's solution of chlorinated soda, for a few hours after the alcohol. Especially do I recommend the Labarraque for all kinds of wood. In twelve hours wood is generally bleached; too long a residence in it will, however, often cause it to fall in pieces.

After removing from the soda, wash through a period of twelve or eighteen hours in half a dozen waters, the third of which may be acidulated with about ten drops of nitric acid to the ounce, which acid must be washed out. Next put in alcohol, in which sections and also leaves may be kept indefinitely, ready for dyeing.

Magenta, when used for leaves, should be of the strength of one-eighth or one-quarter of a grain to the ounce of alcohol, and purples and iodine-green two or three times as strong. These anilines are inferior to the blue in bringing out all the anatomical parts of a leaf, including the beautiful crystals so often met with. On removal from the dye, leaves should be thoroughly brushed with camel-hair pencils.

One week, instead of forty-eight hours, is frequently required to effect the decoloration of large leaves in chlorinated soda, even when they are cut into several pieces, which is advisable.

Mr. L. R. Peet, of this city, whose stainings in aniline are unsurpassed for beauty, thinks better results are attained by commencing with a weak dye, say from one-twentieth to one-twelfth of a grain, and slowly increasing the strength of the dye, at intervals of from one to three hours, until the required hue is obtained. This process certainly guards against too deep staining, and may give a finer tone to leaves under the glass.—GEO. D. BEATTY, M.D., *Baltimore, in Science-Gossip.*

## NOTES.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—The 24th meeting of the Association will be held in DETROIT, Mich., beginning on *Wednesday, August 11*, next. The circular of the Permanent Secretary states that the headquarters of the Association will be at the Russell House, on Monday and Tuesday preceding the meeting, and on Wednesday and the following days at the City Hall and Court House, where the general and sectional sessions will be held, and where the Association will be well accommodated. The citizens of Detroit have formed a large working local committee, comprising nearly two hundred of the leading citizens, with the Governor of the State as Chairman, and we are assured that everything possible will be done to make the meeting a successful one so far as the local arrangements are concerned, while the extraordinary interest taken in the last meeting by the members indicates that the scientific element of the next meeting will be